Abstract

An imaging system with an integrated source and detector array. A plurality of light detectors are arranged in an array and a corresponding plurality of light sources are arranged in an array in an epi-illumination system so that light radiated from a point on the object illuminated by a given source is detected by a corresponding detector. An optical system is disposed so as to illuminate an object with light from the source array and image the object on the detector array. Ordinarily, the sources and detectors are coplanar and, preferably, are fabricated or at least mounted on the same substrate. In one embodiment the Airy pattern of the point response of the optical system encompasses both a detector and corresponding light sources. In another embodiment, the optical pathway is split by a diffractive element to produce conjugate points corresponding to light sources and their respective detectors. In a further embodiment, the pathway is split by a Wollaston prism. In yet another embodiment where the illumination and image light have different wavelengths, the pathway is split by dispersion. Another embodiment comprises a power supply connected to the plurality of light sources, a signal conditioning circuit for receiving and digitizing output signals from the light detectors so as to produce a respective set of output values, and an equalizing system for equalizing the output values for a given input radiance.